EXH. DJL-3 (Apdx. H)
DOCKETS UE-240004/UG-240005
2024 PSE GENERAL RATE CASE
WITNESS: DAVID J. LANDERS

BEFORE THE
WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION, **Complainant,** **v.** **PUGET SOUND ENERGY,** **Respondent.**	**Docket UE-240004** **Docket UG-240005**

APPENDIX H (NONCONFIDENTIAL) TO THE SECOND EXHIBIT TO THE PREFILED DIRECT TESTIMONY OF

DAVID J. LANDERS

ON BEHALF OF PUGET SOUND ENERGY

FEBRUARY 15, 2024

PUGET SOUND ENERGY

Grid Modernization: Pole Inspection and Remediation

Corporate Spending Authorization (CSA)

Date Created:	Friday, February 10, 2023
Discretionary/ Non-Discretionary:	Discretionary
Multi Year Rate Plan:	Programmatic
Equity Impact:	Yes
Strategic Alignment:	Operate the Business-Reliability
Estimated In-Service Date:	Sunday, December 31, 2028
Current State (Business Need):	PSE has over 340,000 poles associated with approximately 10,000 miles of OH system (about 1/2 of PSEs grid). In 2018 with the help of third party expert, PSE evaluated the pole inspection and remediation program finding significant reject poles had not been addressed and current 30-year inspection cycle for distribution poles out of alignment with industry practice. PSE's current program inspects and treats poles on a 10-year cycle for both transmission and distribution and programmatically addresses poles within prescribed timelines based on established rejection priority. Over time with increased treatment and remediation of rejects, PSE's failure rate associated with degrade poles will decrease (reduce from 6% to 1.5%) thereby requiring less replacement, improving reliability, less O&M, and address safety concerns. PSE's pole program also addresses historic wishbone cross arm construction which are failure prone and a commitment to remediate due to a fatality. Since 2015, PSEs outage minutes as a result of pole failures as increase from 1.2M to almost 6M.

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Desired State (Proposed Solution):	The program solutions include treatment, truss reinforcement that reinstates full strength for deterioration near the bottom of the pole, and full replacement when the top and cross arms are in need of repair. Rejects are identified and either immediately addressed in year or budgeted and completed within the following year. Pole replacement incurs 10%-16% O&M related to capital. Cross arms without full pole replacement are O&M. In addition to address pole integrity, location concerns, joint use, and future capacity needs are consider ensuring pole is put in a safe location, complies with target zero requirements, and is able to handle greater physical load from added telecom or larger conductor needs in the future.

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Outcome/Results (What are the anticipated benefits):	X poles are planned for replacement, remediating the backlog of know rejects and wishbone cross arms by 202X. PSE is in the 5th year of the 10 year cycle targeting reduced reject rate during the next 10-year cycle. Relative to improved reliability, the 2021-2026 program avoids 19.6M CMI.

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Dependencies: No

Dependencies comment: None.

Escalation Included: No, escalation has not been included.

Total Estimated Costs: $119,400,000

Estimated Five Year Allocation:

Funds Type	ID	Line Item Description	Previous Years Actuals	Fiscal 2024 Requested	Fiscal 2025 Requested	Fiscal 2026 Requested	Fiscal 2027 Requested	Fiscal 2028 Requested
Capital	W_R.10009.08.05.05	E Pole Replacement Plan Dist	$ -	$ 16,123,100	$ 12,701,500	$ 8,979,396	$ 8,979,396	$ 10,500,000
Capital	W_R.10009.08.05.07	E Pole Replacement Plan Trans	$ -	$ 6,909,900	$ 5,443,500	$ 3,848,313	$ 3,848,313	$ 4,500,000

Incremental O&M: No

Qualitative Benefits:

The primary benefit of this program is reliability and decrease capital costs in the future as PSE adheres to the 10-year inspection and remediation cycle. This is essentially a proactive program that resolves identified issues before customers experience the poor reliability.

Quantitative Benefits:

Quantitative Benefits	Benefit Type	Previous Years	Fiscal 2024	Fiscal 2025	Fiscal 2026	Fiscal 2027	Fiscal 2028	Fiscal 2029	Remaining Costs	Life Total
Reliability - Avoided CMI	Other	$ 66,000,000	$ 33,000,000	$ 33,000,000	$ 33,000,000	$ -	$ -	$ -	$ -	$ 165,000,000

Risk Summary:

Project risk include permitting complexties specfically related to right of way that requires adherence to target zero which moves poles closer to the edge of the right of way or off right of way which requires easements or addressing environment concerns. O&MRC constraints can challenge the available capital funds required for projects or the program in general.

Benefit risk is minimized as it is realized when the project is completed as backcasting verifies 100% realization as expected.

System risk is associated with complex construction requiring lengthy planned outages or in absence of the proactive program, the run to failure model guarantees decreased reliability and increased cost. Often times repairs are installed in kind to restore power quickly resulting in having to replace to address required location or design needs, essentially duplicating costs and efforts.

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Change Summary:

Planning Cycle	Change Summary	Last Update Date
2022 Baseline Cycle	This CSA has been migrated into the EPPM tool at go-live as part of the Phase 1 EPPM implementation effort. The projects in this CSA were previously approved for the 2023-2027 capital plan. Please refer to the original CSA document for additional information (if available.)	2/10/2023
2023 Cycle 1	Update with last business plan information	3/16/2023

PUGET SOUND ENERGY

Grid Modernization: Pole Inspection and Remediation

Corporate Spending Authorization (CSA)

Approval History:

Approved By	Date Approved
Approved by Cost Center Owner: Lambert , Ryan	3/30/2023
Approved by Cost Center Owner: Lambert , Ryan	4/3/2023
Approved by Director Sponsor: Landers , David	4/7/2023
Approved by Executive Sponsor: Jacobs , Josh	4/8/2023
CSA Status changed to Approved	4/8/2023
Approved by Cost Center Owner: Shrum , Bailey	12/4/2023
Approved by Director Sponsor: Shrum , Bailey	12/4/2023
Approved by Executive Sponsor: Shrum , Bailey	12/4/2023
CSA Status changed to Approved	12/4/2023
Approved by Cost Center Owner: Lambert , Ryan	1/29/2024
Approved by Director Sponsor: Landers , David	1/29/2024
Approved by Executive Sponsor: Jacobs , Josh	2/2/2024
CSA Status changed to Approved	2/2/2024

POLE INSPECTION AND REMEDIATION PLAN

ENERGY TYPE: ELECTRIC

1. SHORT DESCRIPTION

PSE's Pole Inspection and Remediation Plan is an asset management plan that maintains situational awareness of the structural integrity of the overhead electric system supporting structures to optimize asset lifecycle and effectively mitigate system risks in alignment with industry best practices. The PSE Pole plan is based on a 10-year inspection cycle, which includes the following elements of the plan to be successful:

- Inspection
- Treatment
- Reinforcement
- Replacement
- Reporting and Data Integrity Improvement

This is intended to be a sustained plan with no end date where the full plan value is obtained through commitment to maintaining an ongoing 10-year inspection and treatment cycle, which is the foundation of the plan. The plan is well aligned with industry best practice, the NESC, USDA Rural Utilities Service and PSE's Grid Modernization plan.

2. BACKGROUND

PSE has been in the business of managing overhead electric system structures throughout its history. Originally, the ownership for overhead structural integrity management was delegated to regional service centers. They were given autonomy in addressing system needs that were at times unique to their regions. However, over time and with corporate organizational changes, PSE has developed the present-day robust company-wide Pole Inspection and Remediation Plan through several iterations to previous foundations laid for the program. Some milestones in the plan development are:

1995 – 2005: Programmatic Pole Inspections (primarily focused on the Transmission system)

2008: Transmission Wood Pole Program was developed

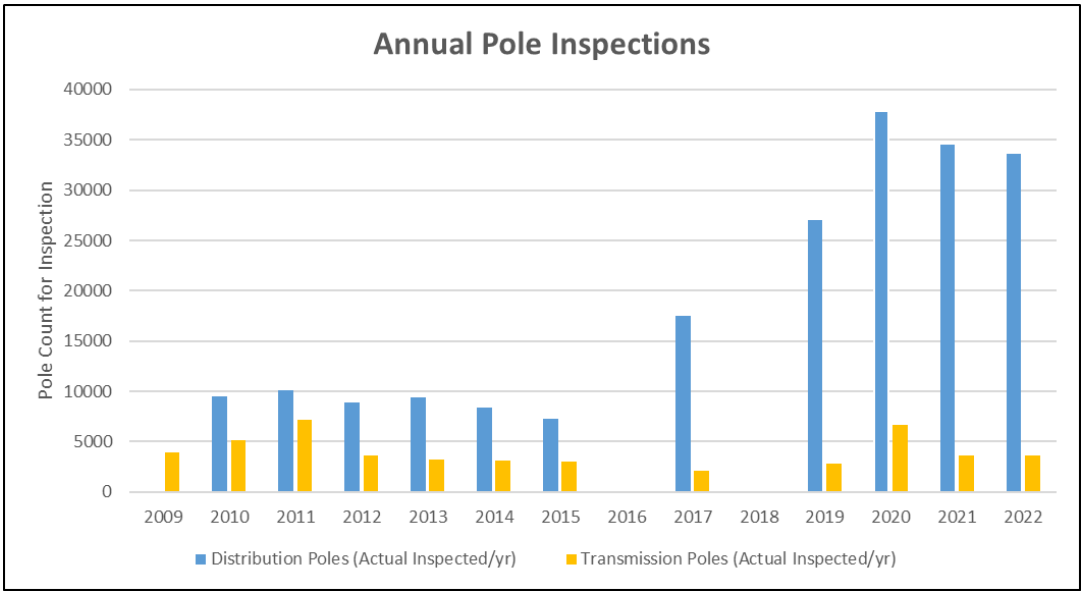
2010: Distribution Wood Pole Programmatic elements were incorporated into the plan

2018: The Pole Program was reviewed and updated

2019: Kicked off the first year of the comprehensive T&D Strategic Pole Program

Below is count of historical inspections per year since 2009 of PSE Transmission and Distribution poles.

Figure 1: History of Pole Inspections



3. BUSINESS NEED

Development of the Pole Inspection and Remediation Plan came about through an increased awareness of the impacts degraded structural integrity has on system resiliency and reliability. In addition to this core driver in developing and maturing the plan, there have been additional operational pain points discovered that this plan has now efficiently mitigated. This plan in its current state has greatly matured asset management of overhead structures as it considers the lifecycle of assets through decreasing system risk, increasing equipment performance, and optimizing costs.

Needs for treatment, reinforcement or replacement of poles are found through inspection and testing on a routine basis on a 10-year cycle. Customer Minutes of Interruption (CMI) related to pole outages are tracked as a measure of the Plan success.

Current Trends:

PSE experienced a continuous increase in overhead-related structural failures and CMI from 2009 through 2020 that affects customer reliability and safety. Since PSE re-initiated the program in 2019, inspection and replacement of defective poles ramped up resulting in a decrease in CMI from 2020 through 2022. See Figure 2 in Section 4.3 for the increased

failure trend and the change since 2020 of decreased CMI. With continued focus on the program, PSE predicts the pole related failures to continue to decrease during the first cycle of the program, 2019 to 2029.

Resulting Benefits:

Having a proactive plan in place improves the integrity of existing poles through treatment and reinforcement. This improves safety for PSE employees and the Public and it improves the overall resilience of Transmission and Distribution lines and can reduce restoration times especially during storms.

Through the planned approach, PSE can optimize its costs by treating wood poles cyclically, which protects the wood and can extend the life of the pole. Reinforcement versus replacement is a cost-effective way to extend the life of the pole in a cost-effective manner when only a portion of the pole has an integrity issue that can be remediated (e.g. strengthening of pole base via c-truss installation). Replacing poles proactively is more thorough, effective and cost efficient compared to doing it reactively.

3.1. NEED DRIVERS

Grid Modernization

- **Safety -** As seen within the industry and within PSE, overhead equipment failures pose a very real safety concern to the public, service providers, employees and the environment. This plan will directly decrease the potential for overhead equipment failures through increasing system resiliency by timely reinforcement or replacement of assets due to structural concerns. In addition to capturing the condition of the pole base, the plan now includes a focused visual inspection of the cross-arm, pole top, pole body, insulators, and hardware. These are all potential failure modes specifically reviewed for condition and addressed within the plan.
- In modernizing the PSE overhead electrical system, we are completely removing all wishbone framing from our operational structures, as it is no longer a construction method utilized by PSE. Modern framing techniques and hardware improve safety and reliability.
- **Reliability –** Through a regular cycle of inspection, the plan enables structural integrity concerns to be identified before they become critical and therefore prevents what could have been future equipment failures that would affect customer reliability through an unplanned outage.
- **Resiliency-** Maintaining sound structural integrity of assets imbeds a resilience, or system hardness, that minimizes consequences of events and the likelihood of outages due to forces of impact by outside sources (vegetation, cars, etc.).
- **Smart & Flexible-** Part of the plan involves asset data acquisition, which is integrated into SAP and GIS systems. This adds value by extending capabilities for use of these systems in managing assets and planning and coordinating inspection and maintenance work. Within the next 10 years, as

data is collected for all assets through a complete inspection cycle of the plan, data integrity & quality of information in our GIS and SAP systems will be greatly improved, particularly for transmission structures not currently fully populated in either system.

- **Cost Optimization**
  - The application of reinforcement provides a cost-effective way to sustain the integrity of the system and extend the life of the overall asset.
  - The application of treatment extends the life of asset by protecting the pole from natural decay, typically adding 15 years of life to a wooden pole structure.

3.2. EQUITY

PSE evaluates equity in the planning process with consideration of the four core tenets of energy justice: Recognition Justice, Procedural Justice, Distributional Justice, and Restorative Justice in various steps of the process.

As specific studies are performed and projects proposed to further a business plan, planners review system, customers, and now equity data to recognize the specific customer burdens, whether there are highly impacted or vulnerable customers that are or will be affected by addressing the specific business need. Planners must prioritize where to focus study each year, thus the full understanding of the historic and ongoing inequities for the entire business plan is extrapolated at this time, maturing over time which greater tools and data.

PSE is building process and tools to enable procedural inclusion in defining the need and solutions through engagement with specific communities and community-based organizations, increasing understanding of local needs and consequences to inform specific study development as well as options to address need. Maturity in where and how this occurs will increase over the next several years. Business plans will be updated as informed this collective engagement to reflect broader equity benefits and burdens as this engagement increases over time.

As specific projects are proposed, PSE's investment decision optimization tool captures equity benefits. An optimized portfolio of projects across many business plans ensures the distribution of benefits and burdens are spread across all segments of the community and aim to ensure that marginalized and vulnerable communities do not receive an inordinate share of burdens or are denied access to benefits. As an initial step, PSE leverages Customer Benefit Indicators ("CBI") and information established as part of the 2021 Clean Energy Implementation Plan ("CEIP") to identify an equity framework to evaluate system projects. The CBI approach was developed through an iterative process that was coordinated with the Equity Advisory Group. These CBI span the core tenets of energy justice and provide a framework to evaluate the comparative equity benefit of each solution alternative considered. Refer to Table 1 for a brief description of the CBIs that address equity and the applicable

benefits for the Pole Inspection and Remediation plan. PSE will continue to adjust and refine equity consideration in projects when necessary, as the process continues to mature.

Projects will be evaluated on each CBI category and a total equity benefit score will be provided.

Table 1: Equity Applicable Benefits

Customer Benefit Indicator	Description	Program Applicable Benefit
Customer Energy Savings	Solutions that lead customers to use less energy, which leads to less energy that must be purchased and potentially a reduction in planned system upgrades.	No
Greenhouse Gas Emissions	Solutions that lead to a reduction of greenhouse gas emissions, either directly or indirectly	No
Enables Cleaner Energy	Solutions that either directly integrate DER on the system or enable the grid to more readily accommodate future DER.	No
Air Quality	Solutions that either directly eliminate the source of a common pollutant or reduce the risk that could cause a common pollutant to increase, such as enabling Electric Vehicle or DER adoption	No
Resilience	Solutions that address major event outages or harden critical facilities to prevent catastrophic events from creating long duration outages.	Yes
Cost Reduction	Solutions that identify least cost alternatives and therefore reduce costs for all customers	Yes
Clean Energy Jobs	Solutions that increase clean energy jobs by furthering clean energy technology application, as described in the CEIP	No
Home Comfort	Solutions that deploy residential energy efficiency in either a targeted solution area or by leveraging load reduction from system wide energy efficiency installations	No

The Pole Inspection and Remediation Plan is programmatically optimized based on total benefit value to cost. Specific program projects are identified based total benefit to cost with named communities receiving additional scored benefit based on vulnerable population designation and highly impact community characteristics, ensuring investments are distributed appropriately and desired benefits accrue to named communities.

Business plans in isolation do not address restorative justice, but continued planning process improvements which include considerations of data, tools, and documentation as well as operational practices will help to restore equity over time.

4. PLAN DETAIL

4.1. PLAN SIZE/POPULATION

The Pole Inspection and Remediation Plan is an asset management plan intended to last as long as there are overhead structures. This plan does not have an end date and is intended to encompass the entirety of the Distribution and Transmission overhead system as long as it exists. Some of the oldest poles currently in the system were installed in the 1950s. The continuing implementation of this plan will extend life of assets through timely intervention at the onset of integrity issues and will also detect assets experiencing earlier-than-expected issues and correct them to reduce likelihood of unplanned customer outages and safety risks.

Table 2: Estimated Total Pole Count

Category of System	2023 Approximate Pole Count
Distribution	~ 300,000
Transmission	~ 40,000

Note: Actual Pole counts are always in flux due to line extensions, rebuilds or public improvements

4.2. PROPOSED COMMITMENT TO ACHIEVE ROUTINE CYCLE

A cyclical plan with a 10-year interval of inspection, implemented continuously at a steady pace, will deliver the desired value of increased resilience, decreased failures and equipment life extension. This level of investment will cover the following to achieve full benefit:

- Routine Inspections
- Treatment
- Reinforcement
- Replacement
- Backlog Replacement
- Wishbone Replacement
- Data Acquisition

A key element of plan success is commitment to sustaining the planned interval of inspecting all overhead structures every ten years.
The current cycle involves addressing a list of known backlog issues on the system through the replacement of structures. This backlog of historic reject poles and wishbone structures is forecasted to be addressed by 2024, and the intended steady state, with decreased rejections requiring pole replacements, achieved by 2029.

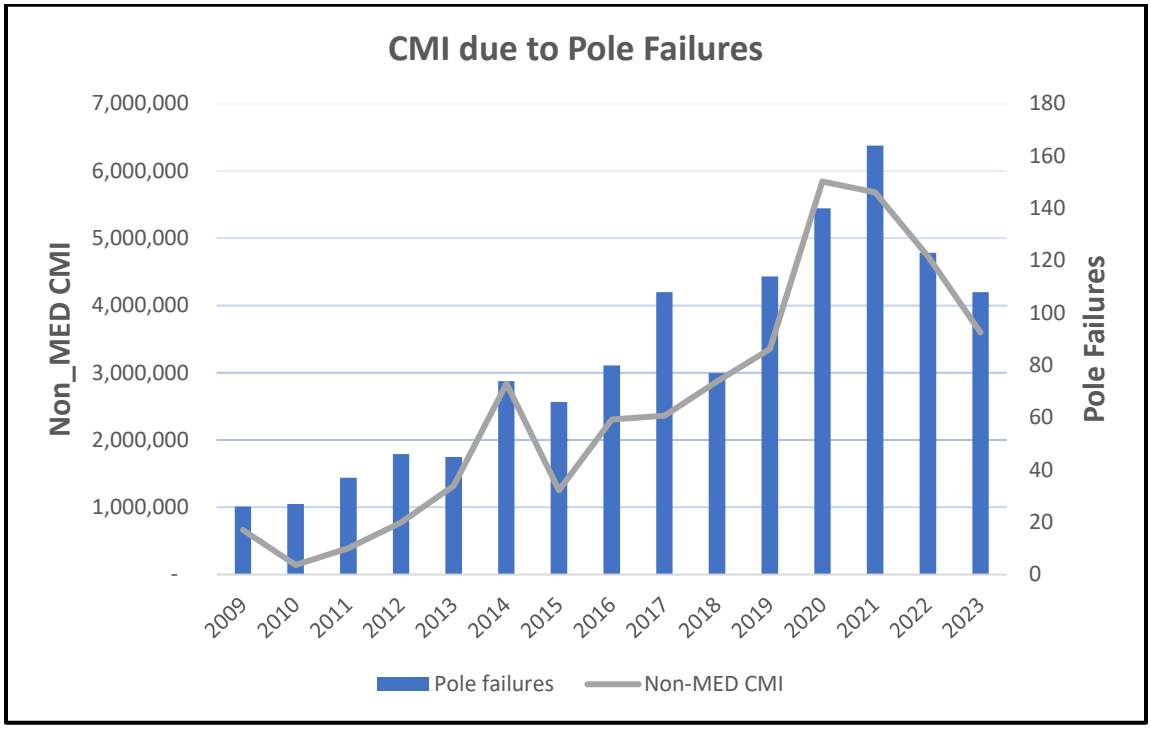
The next cycle, from 2029 through 2038, is then forecasted to have a more consistent budget level since pole maintenance will be current to plan and backlog replacements should all be complete.

4.3. Summary of Plan Benefits

4.3.1 Outage Trend Reduction Due to Fewer Overhead Equipment Failures

One of the primary benefits of the plan is timely diagnosis of asset integrity issues, enabling proactive replacements before customers experience an outage caused by asset failure. Previously, the trend for overhead equipment outages was notably increasing. However since 2020, following kick-off of the T&D Strategic Pole Program in 2019, we have experienced a decrease in pole-related outages. See the latest data for pole related outages and the associated CMI impact in the chart is through September 2023.

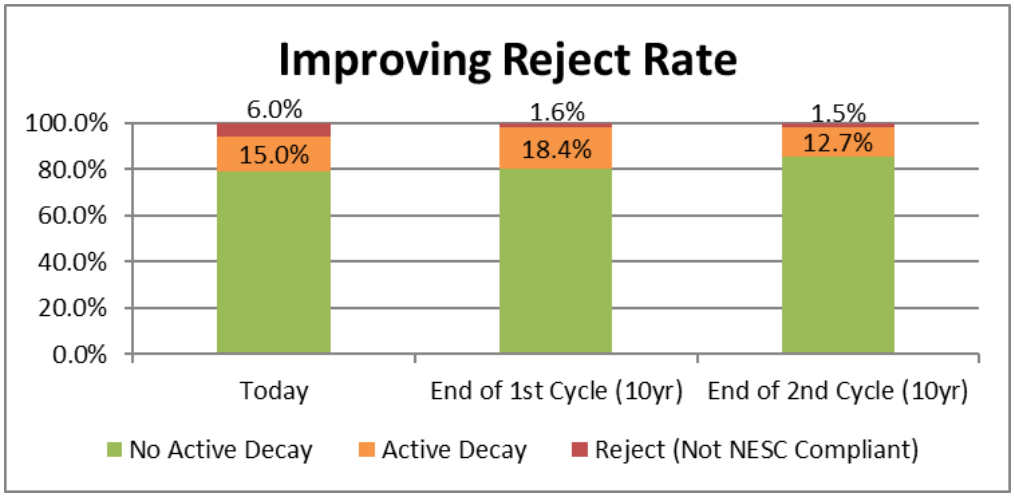
Figure 2: Non-MED CMI impacts due to Pole related failures



4.3.2 Reject Rate

From the analysis Osmose completed in 2018 using historic pole inspection data from 2009 to 2017 and industry wide data, the below values in Figure 3 are expected system-wide reject rates when there is a committed and continuous 10-year cycle pole plan that covers inspection, treatment, reinforcement & replacement:

FIGURE 3: REJECT RATE PROJECTION



4.4 INVESTMENT DECISION BENEFITS

PSE employs an Investment Decision Optimization Tool (iDOT) to evaluate benefits of projects and optimize annual portfolios. The primary iDOT benefits this plan addresses are:

- Outage Concern
- Worker Health and Safety Risk
- Cost Avoided

Table 3: Summary of Plan Benefits, Population and iDOT B/C Score

	Estimated Poles Replaced	Total Plan ($M)	Pole Inspections	Non-MED CMI saved	iDOT B/C Score
2025-2026	2,776	$33.3	73,000	4,682,846	4.17

4.5 ESTIMATED COSTS

Estimated costs are generated based on historical costs of similar types of projects, allowing for variations in project scope, increase in project cost due to inflation, and added contingency to account for unforeseen conditions associated with the projects. The following table indicates the average cost per structure used for this business plan:

Table 4: Unit Costs

Description	Capital	O&M	Total
Avg. Inspect/Treat Dist.	$29	25	$54
Avg. Inspect/Treat Trans.		$60	$60
Avg. Replace – Dist.	$14,100	$900.00	$15,000.00
Avg. Replace – Trans.	$33,200	$6,800.00	$40,000.00
Reinforcement Distribution	$1,228		$1,228
Reinforcement Transmission	$2,451		$2,451

5. FUNDING ALTERNATIVES

5.1 FUNDING ALTERNATIVES

Increase Funding from Proposed – If we were to increase the funding for a couple of years, it would help to address the current backlog quicker and advance the Plan to the mature cycle faster with all structures inspected within the desired interval. However, per recommendation of the USDA Rural Utilities Service, this could result in an over-investment in asset management of PSE's overhead structures that would not provide additional returned value to the customer. Several things this would affect are:

- Getting to full maturity of the plan cycle faster, and therefore getting to a decreased reject rate faster
- structures trending toward failure would be addressed at a more frequent basis, but with an increased rate the projection is that the benefit would be marginal
- Current backlog would be addressed faster
- From industry research, in PSE's service territory, the expected life of treatment is about 10 years. Therefore, increasing the frequency would have a minimal benefit on life extension of equipment

Decrease Funding from Proposed – The success of this plan is dependent on a commitment to a 10-year inspection cycle which makes the decrease in funding very impactful to achieving the desired benefits of the plan.

- If inspection & treatment is delayed then PSE will see increased degradation of structures that could be reinforced and may end up failing, requiring full replacement
- A backlog of inspection and replacements will begin to develop
- Lifecycle optimization will begin to be lost, which will decrease the cost optimization benefits
- Asset failures will increase

- The operational efficiencies of maintaining a consistent rhythm will be jeopardized. Some departments have begun to integrate information that will be provided by the T&D Strategic Pole Plan into their system planning schedule, and when there are delays this can have significant cascading effects.
- Safety concerns will increase
- Liability concerns will increase

6. PLAN DOCUMENT HISTORY

The current version of the project summary supersedes all previous versions.

Date	Reason(s) for Update	Summary of Significant Change(s)	Modified By
6/9/2020	Creation of Business case	This is the initial write-up of the T&D Strategic Pole Program Business Case	Kevin Gowan
03/26/2021	Annual Update	2020 Metrics update	Stephen Hartnett
07/12/2021	Used and useful Policy guidance	Add alternative and cost information	Stephen Hartnett
12/01/2021	Annual Review	Minor word and format changes	Stephen Hartnett
11/01/2023	Annual Review	Includes equity, Remove ISP, Updated program completion and costs	Stephen Hartnett
12/5/2023	2024 MYRP Update	Updated Equity Table, Primary iDOT categories, and Program Summary Table to align with 2025-2026 project submittals	Krista Malmgren

7. SUPPORTING DOCUMENTATION

Document Name
STANDARD 1025_1950: WOOD POLE INSPECTION, TREATMENT, AND REINFORCEMENT
STANDARD 0900_1060: IDENTIFYING POLE INSPECTION TAGS
PSE STRATEGIC POLE PROGRAM MANUAL
ABOVE GROUND PSE PHOTO GUIDE
POLE PROGRAM REPORTING GUIDE

PSE WISHBONE STRUCTURE VISUAL INSPECTION GUIDE
POLE PROGRAM PROCESSES